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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/775,838	02/01/2001	Toshio Hata	299002051900	1157
25226	7590	10/05/2004	EXAMINER	
MORRISON & FOERSTER LLP 755 PAGE MILL RD PALO ALTO, CA 94304-1018			LE, THAO X	
			ART UNIT	PAPER NUMBER
			2814	

DATE MAILED: 10/05/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/775,838

Applicant(s)

HATA ET AL.

Examiner

Thao X Le

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
 - If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
 - If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
 - Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 September 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3-11 and 15-17 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3-11 and 15-17 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

1. Claims 2, 12-14 are canceled.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 1, 3-14, 16-17 are rejected under 35 U.S.C. 103(e) over US 6040588 to Koide et al. in view of US 6130446 to Takeuchi et al and US 4707216 to Morkoc et al.

Regarding to claim 1, Koide discloses in fig. 1 a gallium nitride (GaN) compound semiconductor light emission device (LED) comprising: a substrate 1/2, a n-type electrode region 3a comprising an n-type electrode 9, a GaN compound semiconductor multiplayer structure 3a/3b/5a-c/7a-b/8, fig. 1 including active layer 5, a p-type electrode region 8

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comprising a p-type transmissive electrode 10, column 5 line 66, wherein p-type transmissive electrode substantially transparent, and the p-type transmissive electrode transmit light which is generated in the active layer 5 and reflect from the substrate 1/2 so that light exits the light emission device 20.

But, Koide does not disclose an n-type transmissive electrode that is substantially transparent and transmits light.

However, Morkoc reference discloses a LED comprises n-type electrode 522 and p-type electrode 521, fig. 5, that are light transmissive, column 7 lines 13-15. At the time the invention was made; it would have been obvious to one of ordinary skill in the art to use the light transmissive electrode teaching of Morkoc in Koide's LED, because it would have allowed the light to pass through. Furthermore, Takeuchi reference discloses the n-type electrode on n-type GaN substrate, fig. 1, and column 3 lines 25-45, having various thickness of less than 30 nm, table 1, the thin n-type electrode of Takeuchi would be light transmissive. At the time the invention was made; it would have been obvious to one of ordinary skill in the art to use the n-type electrode teaching of Takeuchi with Koide's device, because it would have created a good ohmic contact as taught by Takeuchi, column 2 line 25.

Regarding to claims 3-4, Koide discloses a GaN compound LED, wherein the n-type electrode 9 is located outside and is formed at least partially or completely around a circumference of the p-type transmissive electrode, fig. 1. The fig. 1 is the side view of the device and the top view (not shown) would have shown the surrounding structure as claimed.

Regarding claims 5 and 16, Koide discloses the GaN compound LED includes a buffer layer 2, and an n-type GaN nitride compound semiconductor layer, fig. 1.

But Koide does not disclose the n-type transmissive electrode is formed on a side face of the substrate, a side face of the buffer layer, and a side face of the n-type GaN layer a region neighboring the buffer layer and n-type transmissive electrode is formed completely around the circumference of the p-type transmissive electrode. At the time the invention was made; it would have been obvious to one of ordinary skill in the art to rearrange the electrode as claimed, because the rearrangement of parts was held to have been obvious. In re Japikse 86 USPQ 70 (CCPA 1950). In addition, the Applicant has no support data, which convinces that the particular claimed configuration is significant or is anything more than one of numerous configurations a person of ordinary skill in the art would find obvious for the purpose of providing mating surfaces. In re Dailey 149 USPQ 47, 50 (CCPA 1966). See also Glue Co. v. Upton 97 US 3,24 (USSC 1878). Furthermore such n-type side contact and surrounded contact are already disclosed by many patents such as US 6146,916 in fig. 7, US 6268618 in fig. 17-18, US 5739554 in fig. 2, US 6410944 in fig. 3, or US 6242 761 in fig. 1. This has demonstrated that the rearrangement of n-type electrode is typical in LED device to establish the contact with n-type layer and direct the light passing through.

Regarding claims 6-9, Koide discloses a GaN LED wherein n-type electrode region 3a further comprises a pad electrode 9, wherein the p-type electrode region 8 further comprises a p-type pad electrode 11, wherein the n-type pad electrode 9 and the p-type pad electrode 11 are provided substantially along one side of a light emitting face of the gallium nitride compound

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semiconductor light emission device, fig. 1, wherein the p-type pad electrode 11 is formed in the vicinity of a center of a light emitting face of the gallium nitride compound semiconductor light emission device, fig. 1.

With respect to the n-type transmissive electrode comprises at least one of the thin metal film, see discussion in claim 1,

Regarding to claims 10-11, 17 Koide discloses a gallium nitride compound semiconductor LED wherein the n-type pad electrode is of a type, which realizes an Schottky contact.

With respect to a gallium nitride compound semiconductor LED device wherein the n-type electrode comprises an Al, see discussion in the above claim 1 and Takeuchi discloses the n-type electrode comprises Al having a thickness less than 30 nm, table 1, and Koide discloses the p-type transparent electrode 10 having a general thickness. Accordingly, it would have been obvious to one of ordinary skill in art to use the thickness teaching of Takeuchi and Koide in the range as claimed, because it has been held that where the general conditions of the claims are discloses in the prior art, it is not inventive to discover the optimum or workable range by routine experimentation. See *In re Aller*, 220 F.2d 454, 105 USPQ 233, 235 (CCPA 1955).

5. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over US 6040588 to Koide et al. in view of US 4707216 to Morkoc et al. and US 5309001 to Watanabe et al.

Regarding to claim 15, Regarding to claim 1, Koide discloses in fig. 1 a gallium nitride (GaN) compound semiconductor light emission device (LED) comprising: a substrate 1/2, a n-type electrode region 3a comprising an n-type electrode 9, a GaN compound semiconductor

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multiplayer structure 3a/3b/5a-c/7a-b/8, fig. 1 including active layer 5, a p-type electrode region 8 comprising a p-type transmissive electrode 10, column 5 line 66, wherein p-type transmissive electrode substantially transparent, and the p-type transmissive electrode transmit light which is generated in the active layer 5 and reflect from the substrate 1/2 so that light exits the light emission device 20.

But, Koide does not disclose an n-type transmissive electrode that is substantially transparent and transmits light and the n-type transmissive electrode comprises a thick film of ITO.

However, Morkoc reference discloses a LED comprises n-type electrode 522 and p-type electrode 521, fig. 5, that are light transmissive, column 7 lines 13-15. At the time the invention was made; it would have been obvious to one of ordinary skill in the art to use the light transmissive electrode teaching of Morkoc in Koide's LED, because it would have allowed the light to pass through.

With respect to ITO, Watanabe reference discloses an n-type electrode 317 comprises Al, ITO, column 15 line 40. At the time of the invention was made; it would have been obvious to one of ordinary skill in the art to use the ITO transparent electrode teaching of Watanabe to replace the Al electrode of Nagahama, because such electrode substitution would have been considered a mere substitution of art-recognized equivalent values.

LOUIS PHAM
PRIMARY EXAMINER

Response to Arguments

6. Applicant's arguments with respect to claims 1, 3-11, 15-17 have been carefully considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thao X Le whose telephone number is (571) 272-1708. The examiner can normally be reached on M-F from 8:00 AM - 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael M Fahmy can be reached on (571) 272 -1705. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Thao X. Le
30 Sep 2004.

LONG PHAM
PRIMARY EXAMINER